In the Specification:

Page 2:

Drill bits of this nature operate under extreme conditions. Very heavy weights are imposed on the drill bit to cause the cutting action. Friction causes the drill bit to generate heat. Also, the temperatures in the well can be several hundred degrees Fahrenheit. Improvements in cutting structure have allowed drill bits to operate effectively much longer than in the past. Engineers involved in rock bit design continually seek improvements to the bearings to avoid bearing ~~failing~~ failure before the cutting structure wears out. There has been a variety of patented proposals to cause circulation of the lubricant. Also, flats, presumably to retain lubricant, have been employed in at least one bit on the unloaded or generally upper side of the journal surface of the bearing pin. Passages led from the other areas of the lubricant system to these flats.

Page 4:

A recess is located on the bearing pin at a point in the range from 185 to 225 degrees, as viewed from the outer end of the bearing pin. The position of the recess is selected based on the lubricant pressure profile of the drill bit. A drill bit bearing has an annular clearance with a minimum clearance on its loaded side and a maximum clearance on its unloaded side. The clearance has a converging zone leading to a minimum clearance point and a diverging zone leading from the minimum clearance point. The lubricant pressure in the clearance increases rapidly in the converging zone near the minimum clearance point and decreases rapidly in the diverging zone immediately following the minimum clearance point. The recess is located where the pressure rapidly decreases. By communicating lubricant reservoir pressure directly to

the point where the prior art negative peak would normally occur, the negative peak is reduced or eliminated. This elimination increases the load capacity of the bearing.

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A cone 23 rotatably mounts on bearing pin 17. Cone 23 has a plurality of protruding teeth 25 or compacts (not shown). Cone 23 has a cavity 27 that is slightly larger in diameter than the diameter of bearing pin 17. Cone 23 has a back face 29 that is located adjacent, but not touching, last ~~machine~~ machined surface 19. A seal 31 seals cavity 27 adjacent back face 29. Seal 31 may be of a variety of types, and in this embodiment is shown to be an O-ring. Seal 31 engages a gland or area of bearing pin 17 adjacent to last machined surface 19.

Pages 9 and 10:

Even though very small, annular clearance 51 does have a largest width or clearance point 51a at approximately zero degrees and a minimum width or clearance point 51b at approximately ~~at~~ 180 degrees due to the downward force imposed on the bit during drilling. Assuming cone 23 rotates in the direction shown in Figure 2 by the arrow, clearance 51 has a converging region 51c from zero to approximately 180 degrees, where the space for the lubricant gradually gets smaller. Clearance 51 has a diverging region 51d, from approximately 180 to zero degrees, where the space for the lubricant gets gradually larger. The minimum clearance point 51b is not typically zero because of lubricant located between bearing pin 17 and cone 23. At times during operation, minimum clearance point 51 may reach zero, but normally does not remain at zero. During operation, minimum clearance point 51b is typically slightly downstream or past 180 degrees a slight amount. The converging region 51c ends at minimum clearance point 51b, and the diverging region 51d begins at minimum clearance point 51b.